

2008 Beacon Manufacturers' Workshop
San Diego, California
9 May 2007

Cospas-Sarsat Update and Beacon Activities

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Cospas-Sarsat Secretariat
Montreal



Source: CNES - D. Ducros

Cospas-Sarsat Update and Beacon Activities

- International Cospas-Sarsat Programme
- Space Segment status
- 2006 Saves
- MEOSAR system and status
- Beacon global market statistics
- Beacon Type Approval Activities
- International Beacon Registration Database
- Cospas-Sarsat recent activities
- Results of the Beacon Manufacturers Survey (2007)
- Cospas-Sarsat Test Facilities
- Beacon Type Approval Review



Cospas-Sarsat Mission and Objective

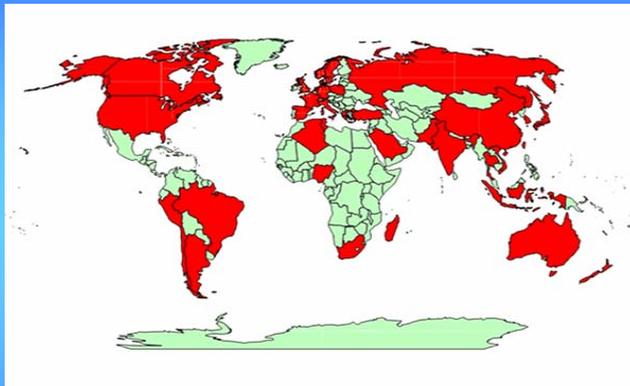


- Mission:** To provide accurate, timely and reliable distress alert and location data to help SAR authorities assist persons in distress.
- Objective:** To reduce, as far as possible, delays in the provision of distress alerts to SAR and the time to locate a distress and provide assistance.
- Strategy:** To implement, maintain, co-ordinate and operate a satellite system capable of detecting transmissions from radio-beacons that comply with C/S specifications.



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Cospas-Sarsat Participating Countries



- 4 Parties
- 25 Ground Segment Providers
- 9 User States
- 2 Organisations



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Cospas-Sarsat System Combined LEO / GEO Operations

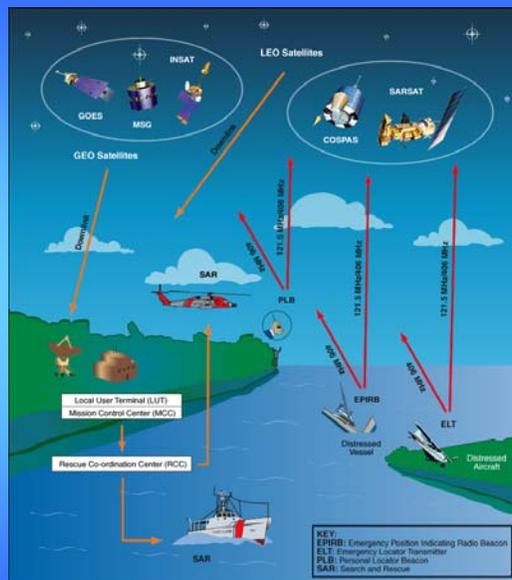


- LEOSAR: Sarsat (NOAA, MetOp) and Cospas (Sterkh)
- GEOSAR: GOES (USA), INSAT (India), MSG (EUMETSAT)



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Cospas-Sarsat System 121.5 MHz and 406 MHz



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Cospas-Sarsat LEOSAR Space Segment

LEOSAR Space Segment Instrument Status

Cospas-Sarsat Payload	406 MHz SARP		406 MHz SARR	121.5 MHz SARR	243 MHz SARR
	Global Mode	Local Mode			
Sarsat-7	O	O	O	O	O ⁽¹⁾
Sarsat-8	O	O	O	O ⁽¹⁾	N
Sarsat-9	O	O	O	O	O
Sarsat-10	O	O	O	O	O
Sarsat-11 ⁽²⁾	O	O	O	O	O

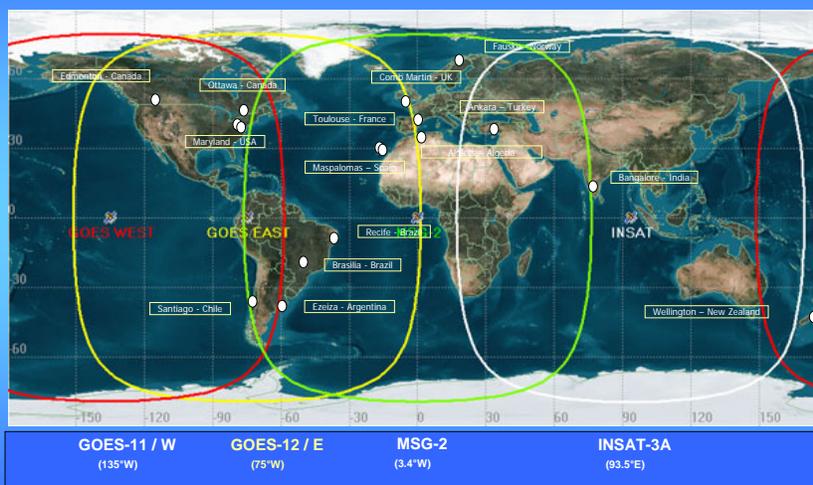
Notes: N - Not operational. (1) Operates intermittently.
 O - Operational. (2) First 406 MHz SARP-3.

LEOSAR Future Space Segment

Cospas-Sarsat Payload	Spacecraft	Launch Date	Status
Cospas-11	Sterkh-1	Projected 2008	Integration phase
Cospas-12	Sterkh-2	Projected 2008	Integration phase
Cospas-13	Sterkh-3	Projected 2012	-
Cospas-14	Sterkh-4	Projected 2014	-
Sarsat-12	NOAA-N'	Projected 2009	Integration phase
Sarsat-13	METOP-B	Projected 2011	-
Sarsat-14	NPOESS-C1	Projected 2013	-
Sarsat-15	NPOESS-C2	Projected 2016	-



Cospas-Sarsat GEOSAR Coverage (February 2008)



406 MHz only !

Cospas-Sarsat GEOSAR Space Segment

- GEOSAR Spacecraft Availability

Spacecraft	Launch Date	Position	Status
GOES-10	April 1997	60° W	In-orbit spare
GOES-West	May 2000	135° W	In operation (GOES-11)
GOES-East	July 2001	75° W	In operation (GOES-12)
GOES-13	May 2006	105° W	In-orbit spare
GOES-14	2008	T.B.D.	Projected
GOEG-15	2009	T.B.D.	Projected
GOES-16	2012	T.B.D.	Projected
GOES-17	2014	T.B.D.	Projected
INSAT-3A	April 2003	93.5° E	In operation
INSAT-3D	2009	83.5° E	Projected
MSG-1	August 2002	3.4° W	In-orbit spare
MSG-2	December 2005	0°	In operation
MSG-3	2011	T.B.D.	Projected
MSG-4	2013	T.B.D.	Projected
Electro-L No.1	2008	76° E	Projected
Luch-M-5	2009	95° E	Projected
Electro-L No.2	2011	T.B.D.	Projected

Notes: T.B.D. - To be determined.



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Cospas-Sarsat LEOLUT Visibility Areas (February 2008)

45 LEOLUTs in
30 countries

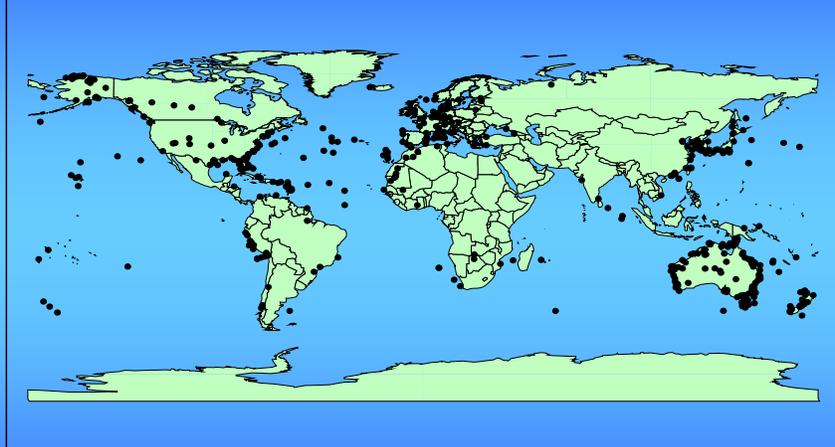


White = 121.5
and 406 MHz
Grey = 406 only



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Cospas-Sarsat 2006 - Alert Locations

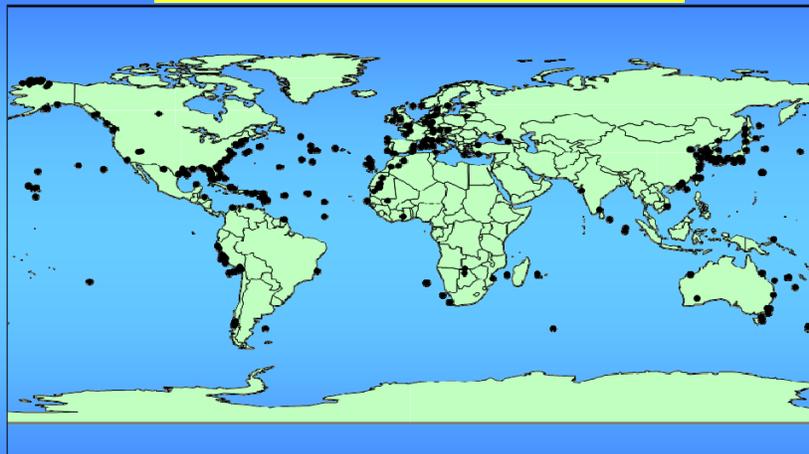


SAR Events: 452
P. Rescued: 1,881



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Cospas-Sarsat 2006 – 406 MHz Alert Locations

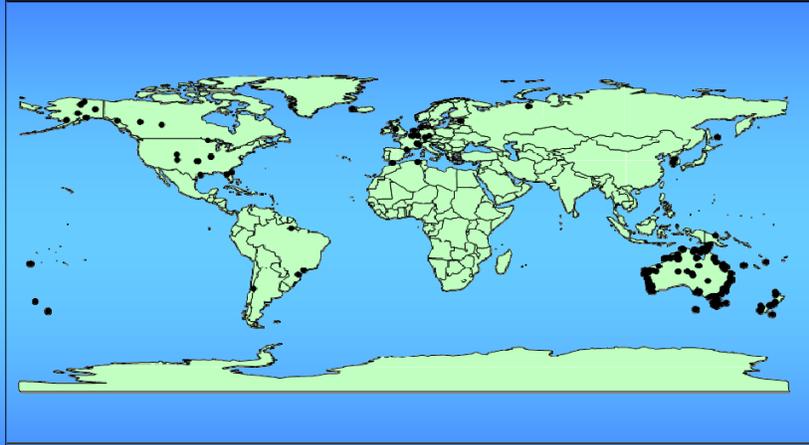


SAR Events: 279 (62%)
P. Rescued: 1,517



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Cospas-Sarsat 2006 - 121.5 MHz Alert Locations

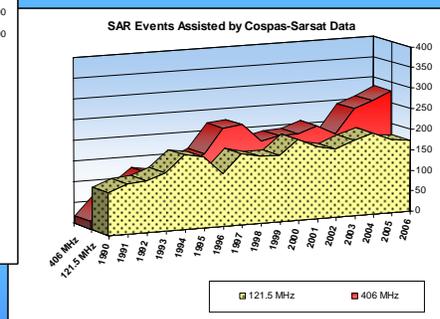
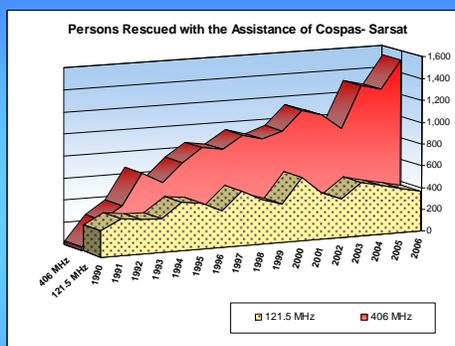


SAR Events: 173 (38%)
P. Rescued: 364



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Cospas-Sarsat Rescue Operations Summary



SAR Events (1982 / 2006) : > 6,200
P. Rescued (1982 / 2006) : > 22,400



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Cospas-Sarsat Current System Limitations

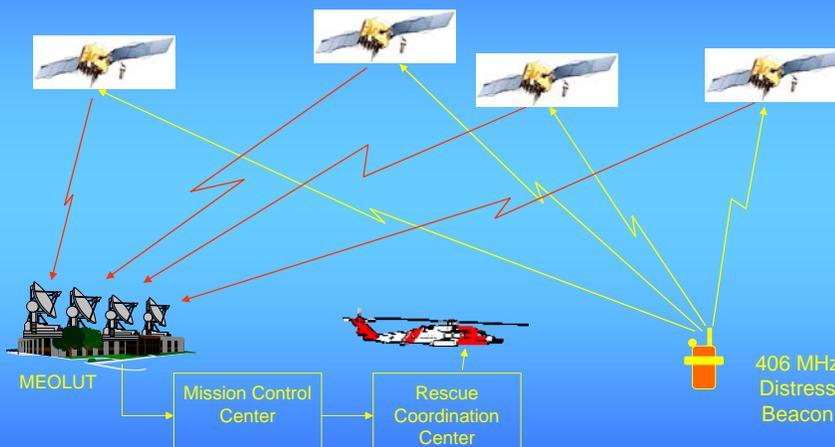
- GEOSAR:
 - Limited coverage beyond 70°N to 70°S
 - Fixed geometry Sat. to beacon (blockage)
 - No Doppler location

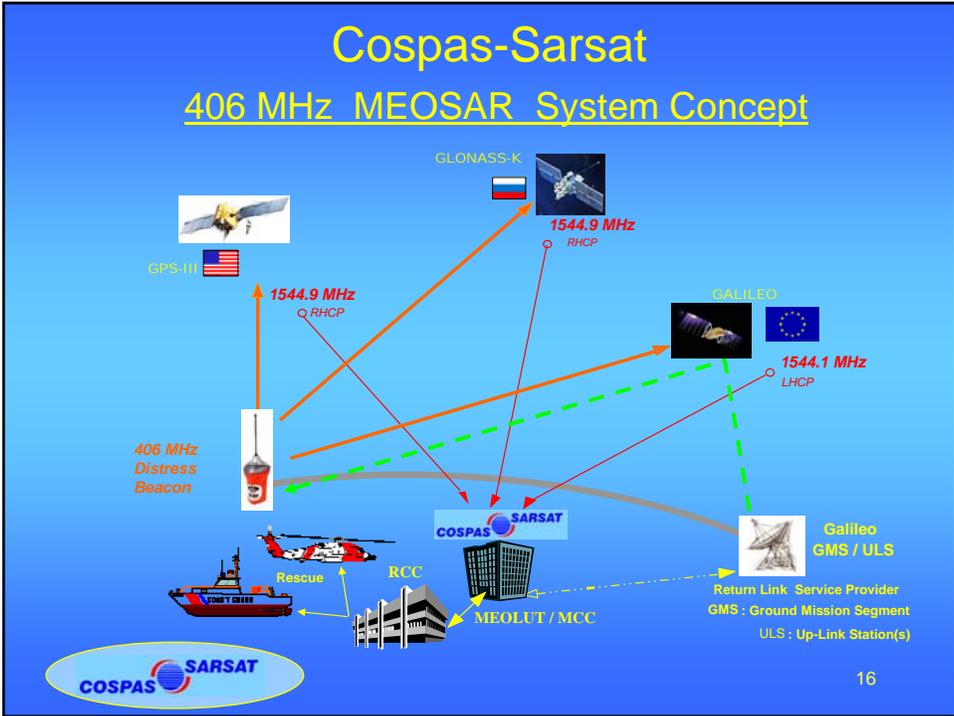
- LEOSAR:
 - Waiting time
 - SARP on-board processing
 - ➔ Structure of beacon message, coding methods are fixed

- System:
 - ➔ Limited options for possible evolution of 406 MHz beacon signal and technology



Cospas-Sarsat 406 MHz MEOSAR System Concept





Cospas-Sarsat 406 MHz MEOSAR System

USA (GPS), Russia (GLONASS), and ESA/EC (Galileo) plan to include 406 MHz repeaters on future medium-altitude Earth orbiting (MEO) satellite constellations

- Backward compatible with C/S T.001 406MHz Beacons;
- SAR components of constellations will be fully interoperable;
- Space agencies coordinating with Cospas-Sarsat on specifications, compatibility, demonstration and evaluation phase;
- C/S R.012 "MEOSAR Implementation Plan" approved by Council.

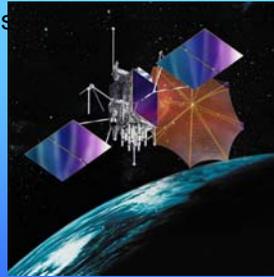
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Cospas-Sarsat 406 MHz MEOSAR System

- DASS

- 24 satellites (+3), 20 200 Km, 6 orbital planes, Inclination 55°
- 9 GPS satellites in orbit with DASS proof-of-concept packages, all S-band downlink, up to 19 satellites
- L-band downlink on GPS III from 2017
- Prototype MEOLUT

GPS Block III satellite



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Cospas-Sarsat 406 MHz MEOSAR System

- SAR/Glonass :

- 24 satellites, 19 100 Km, 3 orbital planes, Inclination 64.8°
- First Glonass K satellite launch from 2010
- Following launches to maintain 24-satellite constellation
- MEOLUT in Moscow in 2008

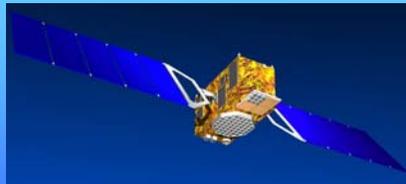
Glonass satellite



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Cospas-Sarsat 406 MHz MEOSAR System

- SAR/Galileo
 - 27 satellites (+3), 23 222 Km, 3 orbital planes, Inclination 56°
 - In-Orbit Validation phase with 4 Galileo satellites in 2010
 - prototype MEOLUT in 2008
 - IOV scheduled for completion in 2011
 - Full constellation planned by end of 2013



Galileo satellite



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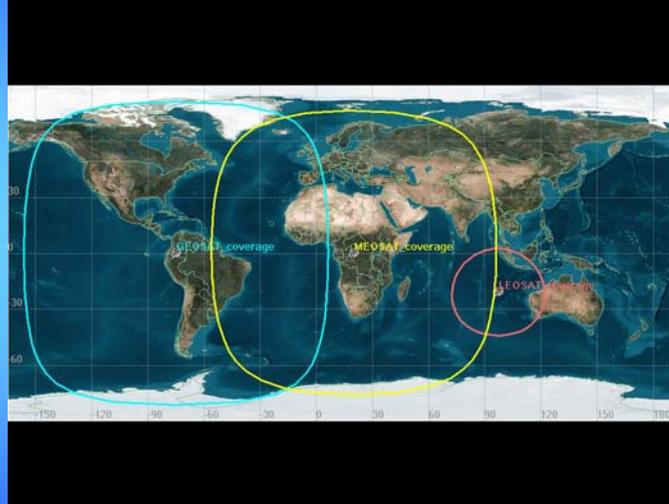
Cospas-Sarsat 406 MHz MEOSAR Expected Performance

- Global coverage with real-time alerting and location data
- Single burst detection and location
- Accurate independent location capability
 - ◇ 5 km or better 95% of the time, no reliance on a navigation receiver
 - ◇ Higher accuracy with internal navigation receiver
- High level of satellite redundancy and availability
- Resilience to beacon-to-satellite link obstructions (i.e. satellite motion alleviates line-of-sight beacon-to-satellite blockages)

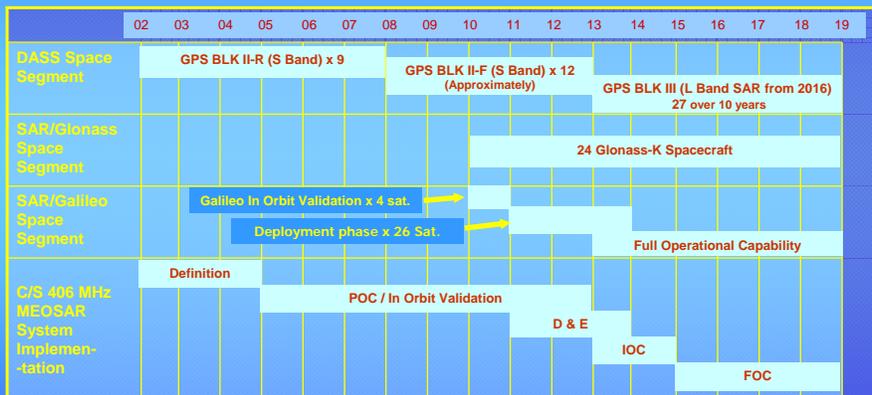


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Cospas-Sarsat Satellite Coverage Comparison



Cospas-Sarsat Tentative MEOSAR Implementation Schedule

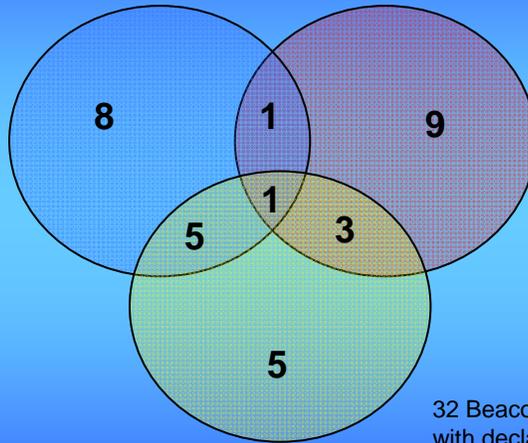


Cospas-Sarsat

406 MHz beacon manufacturers distribution

EPIRB

ELT



32 Beacon Manufacturers
with declared production
in 2007

PLB



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Cospas-Sarsat

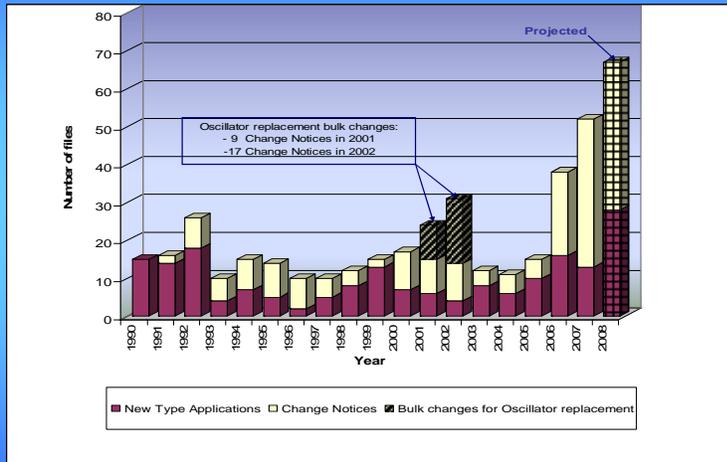
406 MHz beacon manufacturers' environment

	Average Increase/year since 2005	% with Location Protocol in 2007 (2006)	Beacon manufacturer changes since 2005	Beacon manufacturer changes in 2008	New beacon models since 2005 (TAC)
Total	40.5%	56% (40%)	3 new manufacturers	7 new manufacturers, 1 to cease production	40 new TAC
EPIRB	26.5%	40% (27%)	2 new suppliers	3 new suppliers, 1 to cease production	11 new TAC
ELT	18%	12% (15%)	1 new supplier, 2 ceased production	4 new suppliers, 2 to cease production	13 new TAC
PLB	90.5%	95% (84%)	5 new suppliers, 1 ceased production	3 new suppliers	17 new TAC

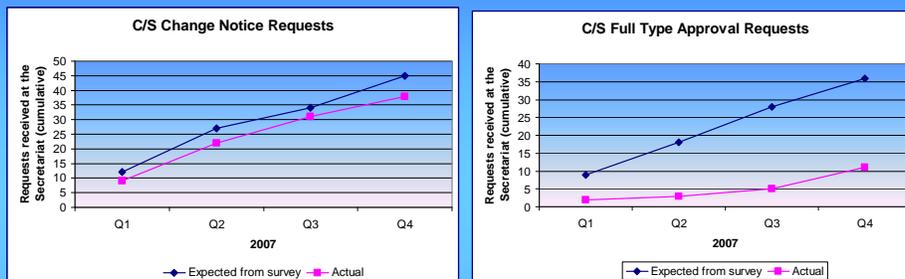


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Cospas-Sarsat 406 MHz Beacon Type Approval Activity



Cospas-Sarsat 2007 Type Approval Requests Predicted (manufacturer's survey) vs Actual



The data provided by the manufacturer was relatively accurate for change notice requests but overly optimistic for Full Type approval requests.



Cospas-Sarsat International Beacon Registration Database Registered beacons (April 2008)

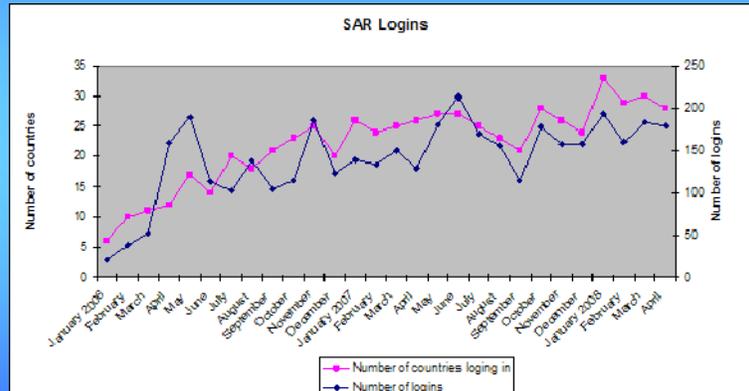
CountryName	Country Code	ELT	EPIRB	PLB	Total
ANGUILLA	301		1		1
ARGENTINA	701	438	414	4	856
ARMENIA	216	16			15
BAHRAIN	408	39			32
BARBADOS	314		1		1
BELIZE	312		7		7
BOLIVIA	729	11			1
BOTSWANA	611	21			21
BRUNEI	508	18		22	38
BULGARIA	207		110		110
CAMBODIA	514	2	1		3
CAMBODIA	515	1	5		6
CAYMAN ISLANDS	319	2	12		14
CHINESE TAIPEI	416	2			2
COMOROS	616		1		1
CONGO	615	1			1
DOMINICA	325		7		7
DUBAI	626	3			3
GUATEMALA	332	9			9
HONG KONG	477	491	1216		1707
HUNGARY	243	2			2
IRAN	422		3		3
ISRAEL	428	102	26	4	132
ITALY	247	299	915		1214
JAPAN	431	761	2		762
JAPAN	432	12			12
JORDAN	438	32			32
KAZAKHSTAN	436	4	1		5
KENYA	634	28			28
KOREA NORTH	445		3		3
KUWAIT	447		28		28
LATVIA	275	72	223	17	312
LEBANON	450	1			1
LIBYA	642	6			6
MACAO	453				1
MADERA	256		1		1
MAURITANIA	604	2			2

MAURITIUS	645	1			1
MOLDOVA	214	81			81
MONACO	254	19			19
MONGOLIA	457	3	4		7
MYANMAR	526	1			1
NEPAL	459	11			11
NICARAGUA	350	1	2		3
NIGERIA	657	3			3
OMAN	461	5			5
PANAMA	351		5		5
PANAMA	352	16	7		23
PANAMA	353		4		4
PANAMA	354		6		6
PANAMA	355		6		6
PANAMA	356		8		8
PANAMA	357		7		7
PANAMA	371		7		7
PANAMA	372		8		8
QATAR	466	2			2
SAN MARINO	266	2	2		4
SAO TOME	658	2			2
SIERRA LEONE	667		7		7
SRI LANKA	417	14	1		15
ST KITTS	341		93		93
SWEDEN	265		5		5
SWEDEN	266		47		47
TANZANIA	674	38			38
TRINIDAD	362	25	3		31
TUNISIA	672	25			25
TURKEY	271	212	691		903
UAE	470	27		1	28
UGANDA	675	1			1
UZBEKISTAN	437	13			13
VENEZUELA	775	32			32
VIETNAM	524	3	138		141
VIRGIN GB	378		2		2
ZAMBIA	678	4			4
ZIMBABWE	679	3			3
TOTAL	2855	3978	100	6933	



6933 beacons registered
(77% increase from 2007)

Cospas-Sarsat International Beacon Registration Database SAR Logins



Cospas-Sarsat Recent meetings (2008)

- TG-1 Implementation of the Cospas-Sarsat Quality Management System. *February 4-8, 2008, Southampton UK.*
- EWG-1 MEOSAR Proof-of Concept (POC)/In Orbit Validation (IOV) Phase. *March 3-7 2008, Brussels, Belgium.*
- EWG-2 Cospas-Sarsat Strategic Plan *April 21-25 2008
Montreal, Canada*



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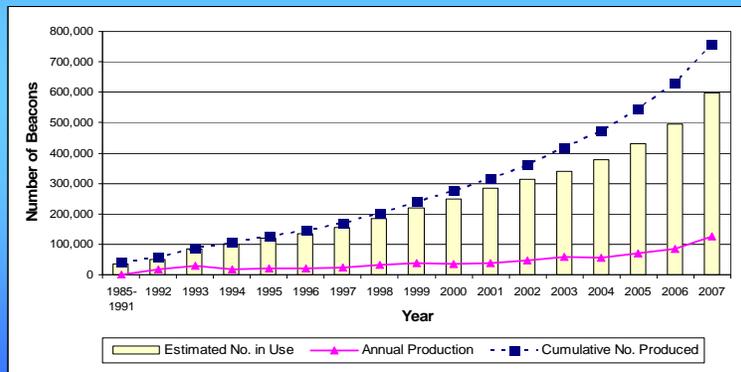
Results of the Beacon Manufacturers Survey (2007)



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Survey Highlights (1)

- **Over 128,000** beacons were produced worldwide in 2007
 - Increase of 50 % over 2006
 - In 2006: 85,000 beacons were produced (+ 20 % over 2005)
- **~600,000** beacons operating at 406 MHz were in use at the end of 2007
 - Global Population estimate up 21 % from 2006



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Survey Highlights (2)

- Surveys are conducted by the Cospas-Sarsat Secretariat annually since 1991
- 43 beacon manufacturers participated in 2008 survey
- Geographical distribution of participating manufacturers:
 - Europe: 51 %
 - USA and Canada: 28 %
 - Asia and Australia: 21 %
- 406 MHz beacon manufacturers in 2007:
 - New manufacturers in 2007: 2 (5%)
 - Manufacturers with 'zero' production: 12 (28 %)
 - Manufacturers with 1 - 499 units produced in 2007: 11 (26%)
 - Manufacturers with > 500 units produced in 2007: 20 (46.5%)
 - Manufacturers with > 500 units planned in 2008: 26 (60%)



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Survey Results

The **128,000** beacons produced worldwide include :

- 59,000 EPIRBs (+ 20 % since 2006)
 - Previous years: 2005 (+23.5%); 2006 (+31.4%)
- 21,000 ELTs (+ 40 % since 2006)
 - Previous years: 2005 (+31 %), 2006 (- 10%)
- 48,000 PLBs (+123 % since 2006)
 - Previous years: 2005 (+44 %), 2006 (+ 30%)



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Beacons with Location Protocols

-72,000 beacons with Location Protocols (LPs) produced in 2007

- 56 % of all beacons manufactured in 2007
- PLBs (64%), EPIRBs (32%), ELTs (4%)

Steady growth trend:

- In 2006, 40 % of beacons were produced with LPs
- In 2005, 35 % of beacons were produced with LPs



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Beacon Distribution by frequency Channels

- 406.025 MHz
 - Closed in 2002
 - Population >336,000 in 2007 (+ 1% since 2006)
 - Annual production decreased by 7% since 2006
- 406.028 MHz
 - Opened in 2000, closed 1 January 2007
 - Population > 261,000 (+ 63% since 2006)
 - Growing annual production (~102,000 in 2007)
- 406.037 MHz
 - Opened in 2004
 - "0" beacon population and "0" production in 2007
 - Production of 406,037 MHz beacons in 2008:
~ 43,000 beacons (~21% of 2008 global production)



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Plans for 2008

- **Over 213,000** beacons to be produced (+ 66 % over 2007)
 - 76,000 EPIRBs (annual production growth: +29%)
 - 43,000 ELTs (+104%)
 - 93,000 PLBs (+ 93 %)
- **780,000** worldwide 406 MHz beacon population
 - (up 30 % from 2007)
- **125,000** (50% of all produced beacons) will have LPs
 - Popular feature, dynamic growth
 - Annual production in 2004 : ~ 70,000
- **30** TAs for new beacon models and **40** change notices from 28 beacon manufacturers



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Accuracy of Beacon Manufacturers' Forecast (2007)

	Manufacturers' Forecast 2007	Actual 2007	2007 Actual over Forecast Discrepancy, %
EPIRBs and SSAS, 2007 production	64,500	59,000	(8.5)
ELTs, 2007 production	22,300	21,000	(9.4)
PLBs, 2007 production	46,700	48,000	1.4
All beacon types, 2007 production	133,500	128,000	(5.8)
Population, all beacon types	~605,000	~600,000	(0.8)



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Cospas-Sarsat Test Facilities



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Cospas-Sarsat accepted test facilities for beacon type approval testing

- EPG (Fort Huachuca, USA)
- Intespace (Toulouse, France)
- Mayak (Moscow, Russia)
- Omega (Sevastopol, Ukraine)
- TUV (Fareham, UK)
- ETS (Reichenwalde, Germany)

Test facilities' contact details:

<http://www.cospas-sarsat.org/Beacons/beaconTypeApprovalLabs.htm>



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ETS – A new Cospas-Sarsat type approval laboratory

- In April 2008, the Council CSC-40 **DECIDED** to grant interim acceptance to the Eurofins ETS Product Service GmbH test facility. In accordance with Cospas-Sarsat Policy, the acceptance will be reviewed by the Joint Committee in June. The JC is to provide recommendations to the Council for a final decision in October 2008.
- Lab is ready for beacon TA testing
- Cospas-Sarsat Web-site amended
- TA test reports will be reviewed by the Secretariat as for any other accepted laboratories
- ETS representative – Mr Toralf Jahn



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ETS – information on C/S web-site

List of Test Labs - Mozilla Firefox

International Satellite System For Search and Rescue

COSPAS SARSAT

Home Description Status Beacons Documentation Management

TEST LABORATORIES FOR COSPAS-SARSAT TYPE APPROVAL OF 406 MHz BEACONS

LABORATOIRES D'ESSAI POUR APPROBATION DE TYPE COSPAS-SARSAT

FRANCE

PRINCEPS Laboratory c/o rand-point Pierre Guilbaudat B.P. 4326 31029 Toulouse Cedex 4	Tel: +33 5 61 28 20 96 or +33 5 61 28 11 11 Fax: +33 5 61 28 11 12 Email: Gerard.Pierres@cospas-sarsat.fr
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Contact: Mr Gerard Pierrou, District Beacon Test Responsible

GERMANY

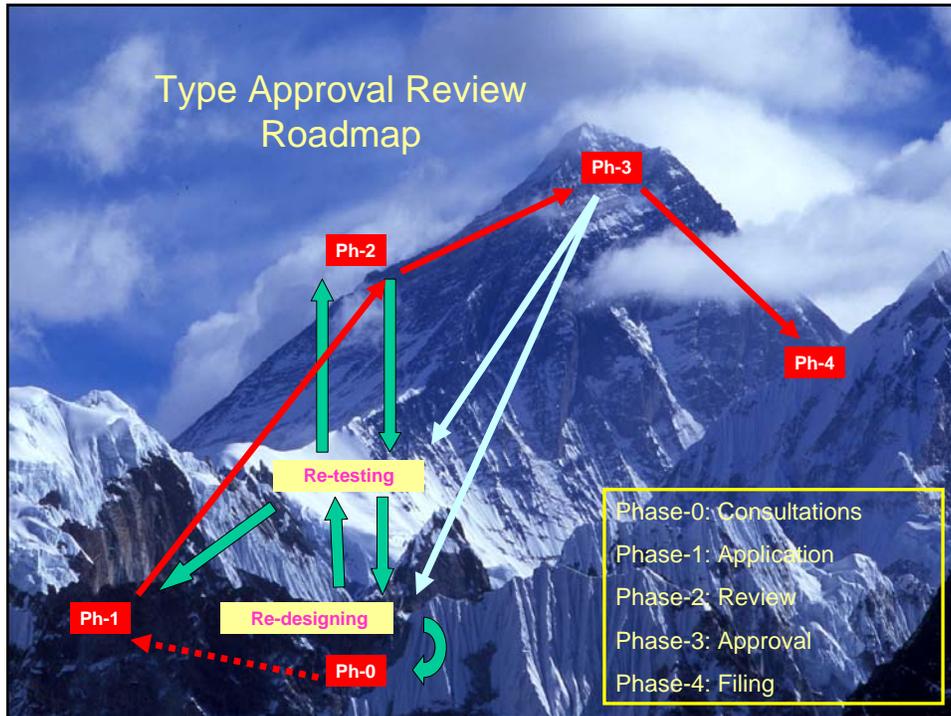
Eurofins ETS Product Service GmbH (*) Storkower Str. 38c D-13526 Fachenseinde b. Berlin	Tel: +49 33631 888 214 Fax: +49 33631 888 560 Email: Toralf.Jahn@eurofins.de Website: www.ets-gs.com
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Contact: Mr. Toralf Jahn, Radio Communication Manager
(*) Interim acceptance, status to be confirmed by the end of 2008.

RUSSIA

SC Test Centre "Mirak" 890005 D. Avastromskaya Str.	Tel/Fax: +7-495-228-0081
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Beacon Type Approval Review



Type Approval Review Time Line

- Initial Review by the Secretariat: up-to 30 calendar days
- Approval by the Parties: up-to 15 calendar days
- TA number assignment: same day of approval
- Website report publication: 3 days upon approval
- Certificate issue: 15 calendar days



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Ways Forward (Recommendations)

- Improved communication between manufacturers, labs and the Secretariat during all phases
- Further improvements to T.007 procedures and reporting
- Enhanced standardised reporting
- More C/S accepted test facilities



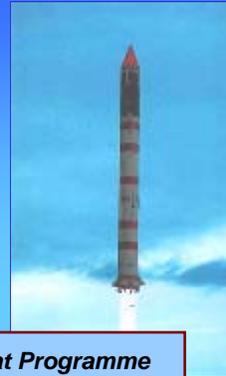
50

Thank you for your attention...



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Cospas-Sarsat Contacts



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Montreal, Quebec H3B 5M2
Canada

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Website: www.cospas-sarsat.org

